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(71) Applicant: **HONDA MOTOR CO., LTD.**
Tokyo, 107-8556 (JP)

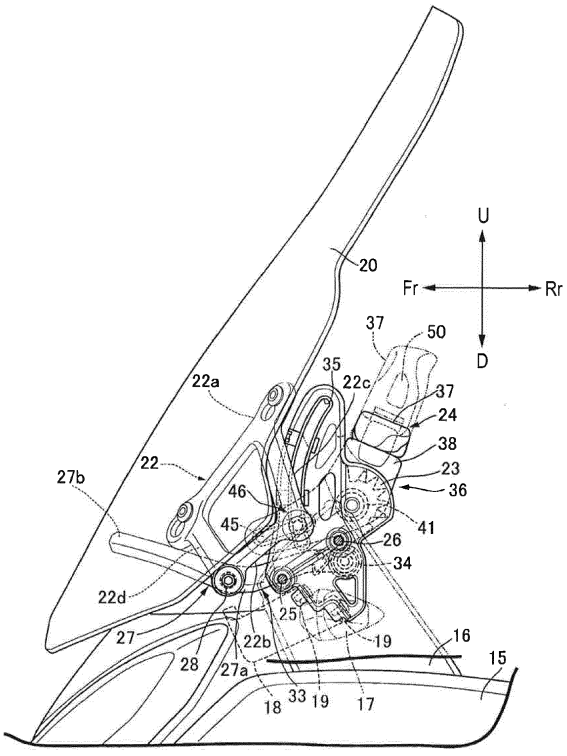
(72) Inventors:
- **TSUDA, Haruka**
  Wako-shi, Saitama 351-0193 (JP)
- **KAWAMURA, Ippei**
  Wako-shi, Saitama 351-0193 (JP)

(74) Representative: **Stevens, Jason Paul**
Dehns
St Bride's House
10 Salisbury Square
London
EC4Y 8JD (GB)

(54) SCREEN MOVING DEVICE IN A SADDLE-RIDE TYPE VEHICLE

(57) A saddle-ride-type vehicle comprising a wind shield screen (20) arranged in front of a steering handlebar, wherein vertical movement of a pair of left and right support members (22) disposed on the screen (20) are guided by a pair of left and right fixed rail brackets (23), an operation lever (24) which is manually operable so as to vertically move the screen (20) and is constituted of a lever main portion (36) which is rotatably supported on at least one of the pair of rail brackets (23) and is connected to the respective support member (22), and a grip (37) which is connected to the lever main portion (36) such that the grip (37) is operable between a projecting position where the grip (37) projects from the lever main portion (36) and a storage position where the grip (37) is folded toward a lever main portion side.

[FIG. 3]



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Description

[0001] The present invention relates to a saddle-ride-type vehicle where a wind shield (windscreen) is arranged in front of a steering handlebar in a vertically movable manner, and more particularly to an improvement in a screen moving device.

[0002] JP-A-2014-028591 discloses a motorcycle where a screen arranged in front of a steering handlebar is vertically moved by an electrically operated motor.

[0003] In the case where the screen is driven by an electrically operated motor as in JP-A-2014-028591, a power transmission mechanism constituted of a drum, a pulley, a cable and the like is necessary, and hence, a screen moving device becomes complicated and expensive. It may be possible to vertically move the screen by operation of an operation lever by a vehicle user, without using an electrically operated motor. In this case, to enhance operating property by reducing a force necessary for operating the operation lever, it is desirable to increase a length of the operation lever as much as possible. However, elongation of the operation lever leads to the screen moving device becoming large, and thus gives rise to a possibility that parts around the operation lever are adversely affected and also to a possibility that a field of view of an occupant is affected during driving. Accordingly, it is necessary to make the moving device as compact as possible, and hence, the elongation of the operation lever is restricted to some extent so that the enhancement of operating property is limited.

[0004] The invention has been made in view of the above-mentioned circumstances, and it is an object of at least the preferred embodiments of the invention to provide a screen moving device in a saddle-ride-type vehicle in which a screen can be moved vertically in response to the operation of an operation lever and which can be made compact while enhancing operating property.

[0005] According to a first aspect of the invention, there is provided a screen moving device in a saddle-ride-type vehicle where a wind shield screen is arranged in front of a steering handlebar in a vertically movable manner, the screen moving device comprising: support members disposed on both left and right sides of the screen respectively; a pair of left and right fixed rail brackets provided for guiding the support members in a vertically movable manner; and an operation lever connected to at least one of the pair of support members so as to enable a manual operation which moves the screen vertically, wherein the operation lever includes: a lever main portion which is rotatably supported on at least one of the pair of rail brackets and is connected to at least one of the support members; and a grip which is connected to the lever main portion and is capable of being gripped by a vehicle user, and the grip is connected to the lever main portion in a state where the grip is operable between a projecting position where the grip projects from the lever main portion and a storage position where the grip is folded toward a lever main portion side.

[0006] The operation lever which is manually operated by a vehicle user so as to vertically move the screen includes: the lever main portion; and the grip which is connected to the lever main portion and is capable of being gripped by a vehicle user, and the grip is operable between the projecting position where the grip projects from the lever main portion and the storage position where the grip is folded toward a lever main portion side. Accordingly, the screen can be vertically moved by operating the long operation lever in a state where the grip assumes a projecting position and hence, a force necessary for operating the operation lever can be reduced whereby the operating property of the operation lever can be enhanced. Further, by folding the grip to the storage position on a lever main portion side after the grip is operated so as to move the screen, the moving device including the operation lever can be made compact.

[0007] Preferably, the operation lever is rotatably supported on the left rail bracket out of the pair of left and right rail brackets.

[0008] Accordingly, even when the operation lever is operated in a state where the steering handlebar is steered to a left side for locking a handlebar at the time of parking, the operation lever minimally interferes with the steering handlebar and hence, the operating property of the operation lever can be enhanced.

[0009] Preferably, a meter unit which displays vehicle information is arranged between the pair of left and right support members, and the grip is connected to the lever main portion in a state where the grip is folded toward a lateral outside of the vehicle from the lever main portion in the storage position.

[0010] By arranging the grip at the storage position at a position where the grip does not overlap with the meter unit, there is no possibility that a vehicle user will erroneously operate a button arranged on the meter unit at the time of operating the grip toward a projecting position side and hence, the operating property of the operation lever can be enhanced.

[0011] Preferably, both end portions of a connecting member which connects the pair of left and right support members are rotatably connected to the pair of left and right rail brackets, a guide hole which guides the support member along a moving trajectory of the screen is formed in the rail bracket, and a screen biasing spring which biases the screen upward is disposed between the rail bracket and the connecting member.

[0012] With this arrangement, both end portions of the connecting member which connects the pair of left and right support members are rotatably connected to the rail bracket, and the screen is resiliently biased upward by the screen biasing spring disposed between the rail bracket and the connecting member. Accordingly, an operating force necessary for moving the screen upward can be reduced whereby the screen can be easily moved upward with a small operating force.

[0013] In a further preferred form, the guide hole formed in the rail bracket is formed in an extending man-

ner in a curved shape, an elongated hole extending in a direction which intersects with the guide hole is formed in the lever main portion, and a guide projecting portion formed on the support member in a projecting manner is configured to pass through the guide hole and the elongated hole.

[0014] Accordingly, the screen can be moved such that the screen follows an appropriate trajectory without increasing a size of the operation lever and hence, an increase in size of the operation lever can be suppressed whereby the moving device can be simplified.

[0015] Preferably, a wall thickness reducing hole is formed in the grip.

[0016] Thus, a vehicle user can easily grip the grip and hence, the screen can be moved with a small force.

[0017] Preferably, relative positions of the rail bracket and the operation lever are set such that the grip disposed at the storage position is arranged behind at least one of the rail brackets.

[0018] With this arrangement, the grip disposed at the storage position is disposed behind the rail bracket which supports the operation lever. Accordingly, the moving device including the operation lever can be made compact and can be simplified.

[0019] Preferably, a plurality of engaging recessed portions individually corresponding to a plurality of vertical positions of the screen are formed on at least one of the rail brackets, and a locking member which is configured to selectively engage with the plurality of engaging portions corresponding to folding of the grip into the storage position is housed in the inside of the lever main portion.

[0020] The locking member which is operated corresponding to folding of the grip to the storage position is selectively engaged with the plurality of engaging recessed portions formed on the rail bracket. Accordingly, the screen can be held at an arbitrary vertical position with a compact configuration having a small number of parts.

[0021] Preferred embodiments of the invention will now be described by way of example only and with reference to the accompanying drawings, in which:

Fig. 1 is a left side view of a motorcycle according to a first embodiment;

Fig. 2 is a plan view showing a part of the motorcycle as viewed along arrow 2 in Fig. 1;

Fig. 3 is a left side view of the motorcycle as viewed along arrow 3 in Fig. 2 in a state where a screen is lowered;

Fig. 4 is an enlarged view of a part of the motorcycle shown in Fig. 3;

Fig. 5 is a left side view of the motorcycle corresponding to Fig. 3 in a state where the screen is elevated;

Fig. 6 is an enlarged view of a part of the motorcycle shown in Fig. 5;

Fig. 7 is a perspective view of part of the motorcycle as viewed along arrow 7 in Fig. 2;

Fig. 8 is a cross-sectional view taken along line 8-8 in Fig. 4;

Fig. 9 is a cross-sectional view taken along line 9-9 in Fig. 8;

Fig. 10 is an exploded perspective view of an operation lever;

Fig. 11 is a cross-sectional view corresponding to Fig. 8 in a state where a grip is disposed at a projecting position;

Fig. 12 is a side view showing an operation handle and a rail bracket according to a second embodiment; and

Fig. 13 is a view showing a change in an operation load with respect to an operation angle of the operation lever.

[0022] Although embodiments of the invention are explained with reference to attached drawings, in the explanation made hereinafter, directions such as "front", "rear", "left", "right", "up" and "down" should be interpreted from the viewpoint of an occupant seated on a motorcycle.

[0023] As shown in Fig. 1, on a front portion of a motorcycle which is a saddle-ride-type vehicle, a front fork 11 pivotally supporting a front wheel WF and a steering handlebar 12 connected to the front fork 11 are arranged in a steerable manner. A headlight 13 and a headlight cover 14 which covers the headlight 13 are arranged in front of the front fork 11 and the steering handlebar 12.

[0024] With reference to Fig. 2, a pair of left and right side cowls 15 which cover a portion of the front fork 11 and a portion of the steering handlebar 12 from lateral (sideward) directions is arranged on both sides of the headlight cover 14. A pair of left and right cowl support stays 16 which are fixed to a front portion of a vehicle body frame (not shown in the drawing) is arranged so as to project upwardly from front upper ends of the pair of left and right side cowls 15, and a blinker 17 is mounted on the cowl support stays 16 respectively.

[0025] With reference to Fig. 3 to Fig. 7, both end portions of a connecting frame 18 are fastened to the pair of left and right cowl support stays 16 such that each end portion is fastened by a pair of first screw members 19. The headlight 13 is supported on the connecting frame 18.

[0026] A wind shield screen 20 which is movable in the vertical direction is arranged above the headlight 13 and in front of the steering handlebar 12. Support members 22 which are arranged in left and right symmetry are fastened to lower portions of the screen 20 on both left and right sides of the screen 20 respectively. A meter unit 21 which displays vehicle information is supported on the connecting frame 18 such that the meter unit 21 is arranged between the pair of left and right support members 22 as well as between the screen 20 and the steering handlebar 12, and the meter unit 21 is arranged above the connecting frame 18.

[0027] The support member 22 is an integral body

formed of: a first vertical frame portion 22a which extends in the vertical direction such that both upper and lower end portions of the first vertical frame portion 22a are fastened to the screen 20; a second vertical frame portion 22b which extends in the vertical direction laterally outside of first vertical frame portion 22a; an upper lateral frame portion 22c which connects an upper end portion of the second vertical frame portion 22b and an upper portion of the first vertical frame portion 22a to each other; and a lower lateral frame portion 22d which connects a lower end portion of the second vertical frame portion 22b and a lower portion of the first vertical frame portion 22a to each other.

[0028] The movement of the support members 22 of the screen 20 in the vertical direction on both left and right sides is guided by a pair of left and right fixed rail brackets 23 which is formed in left and right symmetry. An operation lever 24 which is manually operable to move the screen 20 in the vertical direction is connected to at least one of the pair of left and right support members 22; in this embodiment, the operation lever 24 is connected to the left support member 22.

[0029] The rail brackets 23 are arranged laterally inside the cowl support stays 16. The rail bracket 23 is fastened to the cowl support stay 16 using a first bolt 25 and a second bolt 26 which is disposed at a position away from the first bolt 25 in an obliquely rearward and upward direction. A connecting member 27 which extends in the lateral direction of the vehicle behind a lower portion of the screen 20 is connected to the lower end portions of the second vertical frame portions 22b of the pair of left and right support members 22 in a rotatable manner using a second screw member 28 respectively, and both end portions of the connecting member 27 are connected to the pair of left and right rail brackets 23 in a rotatable manner respectively.

[0030] The connecting member 27 is an integral body formed of a pair of left and right support arm portions 27a arranged laterally inside the rail brackets 23 and extending in the fore-and-aft (longitudinal) direction, and a bridge portion 27b which extends in the lateral direction of the vehicle behind the lower portion of the screen 20 and connects front end portions of the pair of left and right support arm portions 27a to each other. Both end portions of the connecting member 27 in the longitudinal direction, that is, rear end portions of the support arm portions 27a, are connected to the rail brackets 23 in a rotatable manner about a first rotation axis C1, and front end portions of the support arm portions 27a which are intermediate portions of the connecting member 27 in the longitudinal direction are connected to the lower end portion of the second vertical frame portion 22b of the support member 22 in a rotatable manner about a second rotation axis C2 arranged in front of the first rotation axis C1, that is, an axis of the second screw member 28.

[0031] With reference to Fig. 8, a circular cylindrical first boss portion 29 which is arranged coaxially with the first rotation axis C1 is integrally formed on the rail bracket 23 in a projecting manner below the second bolt 26. On the other hand, a first support sleeve portion 30 which projects toward the first boss portion 29 is integrally formed on a rear end portion of the support arm portion 27a of the connecting member 27 in a projecting manner. A first washer 31 is interposed between the first boss portion 29 and the first support sleeve portion 30. A third screw member 32, which is made to pass through the connecting member 27, the first support sleeve portion 30 and the first washer 31, is threadedly engaged with the first boss portion 29 coaxially with the first rotation axis C1. The third screw member 32 is an integral body formed of: a threaded shaft portion 32a which is threadedly engaged with the first boss portion 29; a rod-like large diameter shaft portion 32b which is formed with a diameter larger than that of the threaded shaft portion 32a and is continuously and coaxially formed with the threaded shaft portion 32a in a state where one end portion of the large diameter shaft portion 32b is brought into contact with the first washer 31; and an enlarged diameter head portion 32c which is continuously and coaxially formed with the other end portion of the large diameter shaft portion 32b on a side opposite to the rail bracket 23 in a state where the enlarged diameter head portion 32c is brought into contact with an outer surface of an end portion of the connecting member 27. An end portion of the connecting member 27 is rotatably supported on the large diameter shaft portion 32b of the third screw member 32 which is threadedly engaged with the first boss portion 29.

[0032] With reference to Fig. 9, a first torsion spring 34 which is a screen biasing spring for biasing the screen 20 upward is disposed between the rail bracket 23 and the connecting member 27, in a state where the first torsion spring 34 surrounds the first boss portion 29 and the first support sleeve portion 30. A guide hole 35 which guides the support member 22 along a moving trajectory of the screen 20 is formed in the rail bracket 23 such that the guide hole 35 extends in a curved shape.

[0033] With reference to Fig. 10, the operation lever 24 is constituted of: a lever main portion 36 which is supported on the left rail bracket 23 (out of the pair of left and right rail brackets 23) in a rotatable manner and is connected to the left support member 22; and a grip 37 which is connected to the lever main portion 36 such that a vehicle user can grip the grip 37. The grip 37 is connected to the lever main portion 36 such that the grip 37 is operable between a projecting position (indicated by a solid line in Fig. 11) where the grip 37 projects from the lever main portion 36 and a storage position (indicated by a solid line in Fig. 2 to Fig. 9) where the grip 37 is folded toward a lever main portion 36 side.

[0034] The lever main portion 36 is constituted of: a lever body 38 which is supported on the left rail bracket 23 in a rotatable manner; and a cover member 39 which is fastened to the lever body 38 using a fourth screw member 40 so as to cover a portion of the lever body 38 from the inside in the lateral direction of the vehicle.

[0035] A circular cylindrical second boss portion 41 is integrally formed on the left rail bracket 23 in a projecting manner above the second bolt 26, and an annular receiving surface 42 which surrounds a proximal end portion of the second boss portion 41 is formed on the left rail bracket 23. Further, a circular cylindrical second support sleeve portion 43 in which the second boss portion 41 is fitted is integrally formed on the lever body 38 such that one end portion of the second support sleeve portion 43 is brought into sliding contact with the receiving surface 42. A fourth screw member 44 having an enlarged diameter head portion 44a is threadedly engaged with the second boss portion 41, with a second washer 63 interposed between the enlarged diameter head portion 44a and the other end portion of the second support sleeve portion 43. Due to such a configuration, the lever body 38 (that is, the lever main portion 36) is supported on the left rail bracket 23 in a rotatable manner about an axis of the second boss portion 41.

[0036] The connecting member 27 which is connected to the rail bracket 23 in a rotatable manner about the first rotation axis C1 is connected to the support member 22 in a rotatable manner about the second rotation axis C2 arranged in front of the first rotation axis C1. With such a configuration, the operation lever 24, the connecting member 27 and the support member 22 together form a link mechanism 33, whereby the connecting member 27 is rotatable in response to an operation of the operation lever 24 by way of the support member 22.

[0037] An elongated hole 45 which extends linearly in the direction intersecting with the guide hole 35 formed in the rail bracket 23 and having a curved shape is formed in the lever body 38. A guide projecting portion 46 which is arranged above a straight line L which connects the first and second rotation axes C1, C2 to each other is formed on an upper end portion of the second vertical frame portion 22b of the left support member 22 in a projecting manner, and the guide projecting portion 46 is made to pass through the elongated hole 45 such that the guide projecting portion 46 is fitted in the guide hole 35 in a slidable manner.

[0038] In this embodiment, the guide projecting portion 46 is formed of: a slide portion 46a which is formed in an elongated manner along the longitudinal direction of the guide hole 35, and which slides in the inside of the guide hole 35; and a pin portion 46b which slides in the inside of the elongated hole 45, and the guide projecting portion 46 is fastened to the support member 22. Conversely, the guide projecting portion 46 may be formed of: a slide portion which is formed in an elongated manner along the longitudinal direction of the elongated hole 45 and slides in the inside of the elongated hole 45; and a pin portion which slides in the inside of the guide hole 35.

[0039] The guide hole 35 is formed so as to guide the guide projecting portion 46 upward along with the upward rotation of the connecting member 27 about the first rotation axis C1 in response to an operation of the operation lever 24 toward a side where the screen 20 is moved upward. In this embodiment, the guide hole 35 is formed such that the guide hole 35 extends generally in the vertical direction while being curved in a frontwardly projecting manner.

[0040] Further, as explicitly shown in Fig. 4 and Fig. 6, the relative positions of the second rotation axis C2, the guide projecting portion 46 and the guide hole 35 are set such that a centreline CL which passes along centre of the guide hole 35 in the width direction of the guide hole and an arc AC which passes the centre of the guide projecting portion 46 about the second rotation axis C2 intersect with each other at an acute angle α in front of and above the guide hole 35.

[0041] A pair of grip support portions 47 is formed on an end portion of the lever body 38 on a side opposite to the second bolt 26 with respect to the second boss potion 41. One end portion of the grip 37 is connected to the pair of grip support portions 47 in a rotatable manner by way of a first support pin 48, such that the grip 37 can be folded toward the lateral outside of the vehicle relative to the lever main portion 36 at the storage position. A second torsion spring 49 which surrounds the first support pin 48 is arranged between the lever body 38 and the grip 37 so as to generate a spring force which biases the grip 37 toward a storage position side.

[0042] A wall thickness reducing hole 50 is formed in the grip 37. The relative positions of the left rail bracket 23 and the operation lever 24 are set such that the grip 37 at the storage position is arranged behind the left rail bracket 23. A resilient member 51 which is resiliently brought into contact with the lever body 38 when the grip 37 is at the storage position is adhered to the grip 37.

[0043] A plurality of engaging recessed portions (in this embodiment, five engaging recessed portions 52, 53, 54, 55, 56), which individually correspond to a plurality of vertical positions of the screen 20, are mounted on a portion of the left rail bracket 23 above the second boss portion 41 at equal intervals in the circumferential direction of the second boss portion 41. Further, a locking member 57 which is operated so as to selectively engage with the plurality of engaging portions 52 to 56 corresponding to the folding of the grip 37 into the storage position is housed in the inside of the lever main portion 36.

[0044] A pair of locking member support portions 58 is integrally formed on the lever body 38 between the second boss portion 41 and the grip support portion 47, and the locking member 57 is supported on the locking member support portions 58 in a rotatable manner by means of a second support pin 59.

[0045] The locking member 57 is an integral body formed of: a locking member main portion 57a which has a cylindrical shape coaxial with the second support pin 59; an engaging pawl portion 57b which projects toward the left rail bracket 23 from the locking member main portion 57a; and a pressure receiving arm portion 57c which projects from the locking member main portion 57a so as to be brought into contact with a pushing arm portion

37a integrally formed on the grip 37.

[0046] The engaging pawl portion 57b is configured such that a distal end portion of the engaging pawl portion 57b can project toward the left rail bracket 23 side through a first opening portion 60 formed in the lever body 38, and can selectively engage with the engaging recessed portions 52 to 56.

[0047] At least one of a surface of the distal end portion of the engaging pawl potion 57b of the locking member 57 which faces a respective engaging recessed portions 52 to 56 side and a surface of a portion of the rail bracket 23 corresponding to a gap formed between the neighbouring engaging recessed portions among the respective engaging recessed potions 52 to 56 which faces an engaging pawl portion 57b side may be formed into an outwardly projecting curved surface, for facilitating the selective engagement of the engaging pawl portion 57b with the engaging recessed portions 52 to 56.

[0048] The pushing arm portion 37a of the grip 37 is configured such that a distal end portion of the pushing arm portion 37a projects into the inside of the lever main portion 36 through a second opening portion 61 formed between the lever body 38 and the cover member 39 in the vicinity of the grip support portion 47. The pressure receiving arm portion 57c is brought into contact with the distal end portion of the pushing arm portion 37a.

[0049] A leaf spring 62 having a resilient arm portion 62a is mounted on the cover member 39. The resilient arm portion 62a generates a resilient force for biasing the locking member 57 toward a side where the engaging pawl portion 57b projects to a left rail bracket 23 side through the first opening portion 60, by coming into contact with the pressure receiving arm portion 57c from a side opposite to the pushing arm portion 37a.

[0050] As shown in Fig. 11, when the grip 37 is at the projecting position, the pressure receiving arm portion 57c is pushed by the pushing arm portion 37a and hence, the locking member 57 is rotated to a position where the selective engagement of the engaging pawl portion 57b with the engaging recessed portions 52 to 56 is released against a spring force of the leaf spring 62. By rotating the operation lever 24 in such a state, the screen 20 can be moved in the vertical direction within a predetermined range. In this case, the guide projecting portion 46 of the left support member 22 moves in the inside of the guide hole 35 and the elongated hole 45. When the screen 20 is moved to the lowermost position and the grip 37 is folded toward the storage position (as shown in Fig. 3, Fig. 4 and Fig. 8), the engaging pawl portion 57b is engaged with the uppermost engaging recessed portion 56 so that the screen 20 is maintained at the lowermost position. When the screen 20 is moved to the uppermost position and the grip 37 is folded toward the storage position (as shown in Fig. 5 and Fig. 6), the engaging pawl portion 57b is engaged with the lowermost engaging recessed portion 52 so that the screen 20 is maintained at the uppermost position.

[0051] The manner of operation of the first embodiment will now be explained. The vertical movement of the support members 22 disposed on both left and right sides of the wind shield screen 20 is guided by the pair of left and right fixed rail brackets 23. The operation lever 24 which is operable so as to move the screen 20 vertically and is connected to at least one of the pair of support members 22 is constituted of: the lever main portion 36 which is rotatably supported on at least one of the pair of rail brackets 23 and is connected to at least one of the support members 22; and the grip 37 which is connected to the lever main portion 36 in a state where the vehicle user can grip the grip 37. The grip 37 is connected to the lever main portion 36 such that the grip 37 is operable between the projecting position (where the grip 37 projects from the lever main portion 36) and the storage position (where the grip 37 is folded toward a lever main portion 36 side) and hence, the screen 20 can be vertically moved by operating the long operation lever 24 in a state where the grip 37 assumes the projecting position. Thus, a force necessary for operating the operation lever 24 can be reduced whereby the operating property of the operation lever 24 can be enhanced. Further, by folding the grip 37 to the storage position on a lever main portion 36 side after the grip 37 is operated so as to move the screen 20, the moving device including the operation lever 24 can be made compact, and the visibility of the screen 20 can be enhanced in such a folded state.

[0052] The operation lever 24 is supported in a rotatable manner on the left rail bracket 23 out of the pair of left and right rail brackets 23 and hence, even when the operation lever 24 is operated in a state where the steering handlebar 12 is steered to a left side for locking a handlebar at the time of parking, the operation lever 24 minimally interferes with the steering handlebar 12. The operating property of the operation lever 24 can thus be further enhanced.

[0053] The meter unit 21 which displays vehicle information is arranged between the pair of left and right support members 22, and the grip 37 is connected to the lever main portion 36 in a state where the grip 37 is folded toward the lateral outside from the lever main portion 36 when it is in the storage position. Accordingly, by arranging the grip 37 at the storage position (that is, a position where the grip 37 does not overlap with the meter unit 21), there is no possibility that a vehicle user may erroneously operate a button arranged on the meter unit 21 at the time of operating the grip 37 toward a projecting position side and hence, the operating property of the operation lever 24 can be enhanced and, at the same time, the visibility of the meter unit 21 is enhanced.

[0054] Further, the link mechanism 33 which enables the connecting member 27 to be rotated by way of the support member 22 in response to the operation of the operation lever 24 is constituted of the operation lever 24, the support member 22 and the connecting member 27. Accordingly, by forming the guide mechanisms disposed on both sides of the screen 20 so as to guide the movement of the screen 20 and portions of the link mech-

anisms 33 for moving the screen 20 using the support member 22 in common, the screen 20 can be moved in the vertical direction with a simple and small structure. Further, the screen moving device has a simple structure and hence, a resistance generated by rattling of the screen 20 can be suppressed so that the screen 20 can be easily moved.

[0055] Further, the connecting member 27 which extends in the lateral direction of the vehicle and has both longitudinal end portions thereof connected to the pair of left and right rail bracket 23 in a rotatable manner about the first rotation axis C1 is connected to the support member 22 in a rotatable manner about the second rotation axis C2 arranged in front of the first rotation axis C1 in such a manner that the support member 22 and the connecting member 27 forms the link mechanism 33. The guide projecting portion 46 which is mounted on the support member 22 in a projecting manner above the straight line L which connects the first and second rotation axes C1, C2 to each other is fitted in the guide hole 35 in a slidable manner. Accordingly, the screen 20 can be supported from behind at two positions separated from each other in the vertical direction, thus suppressing rattling of the screen 20 during traveling.

[0056] The guide hole 35 is formed so as to guide the guide projecting portion 46 upward along with the upward rotation of the connecting member 27 about the first rotation axis C1 in response to an operation of the operation lever 24 toward a side where the screen 20 is moved upward. Accordingly, the further upward the screen 20 is positioned, the larger a distance between two support points, that is, upper and lower portions where the rail brackets 23 support the screen 20 from behind becomes. Accordingly, even when the screen 20 is in a state where the screen 20 is easily affected by a traveling wind, the screen 20 can be firmly held thus providing a structure where rattling of the screen 20 is minimally generated.

[0057] The relative positions of the second rotation axis C2, the guide projecting portion 46 and the guide hole 35 are set such that the centreline CL which passes the centre of the guide hole 35 in the width direction of the guide hole and the arc AC which passes the centre of the guide projecting portion 46 about the second rotation axis C2 intersect with each other at an acute angle α in front of and above the guide hole 35. Accordingly, the screen 20 is supported in an inclined manner such that the guide projecting portion 46 of the support member 22 which is rotatable about the second rotation axis C2 is brought into slide contact with the side surface of the guide hole 35 and hence, generation of rattling of the screen 20 can be suppressed more effectively.

[0058] The first torsion spring 34 which biases the screen 20 upward is disposed between the rail bracket 23 and the connecting member 27, and hence, an operating force necessary for moving the screen 20 upward can be reduced whereby the screen 20 can be easily moved upward with a small operating force.

[0059] Further, by connecting the pair of left and right support members 22 to each other using the connecting member 27, it is possible to acquire not only an advantageous effect where the screen 20 can be moved smoothly by setting the vertical positions of the left and right support members 22 equal to each other at the time of moving the screen 20 upward or downward thus enhancing the operating property of the screen 20, but also an advantageous effect where the screen 20 can be firmly supported by enhancing the rigidity of the support members 22. By forming the guide hole 35 having a curved shape in the rail bracket 23, the weight of the rail bracket 23 can be reduced thus contributing to the reduction of weight of the vehicle body.

[0060] The guide hole 35 formed in the rail bracket 23 is formed in an extending manner in a curved shape, the elongated hole 45 extending in a direction which intersects with the guide hole 35 is formed in the lever main portion 36, and the guide projecting portion 46 formed on the support member 22 in a projecting manner is made to pass through the guide hole 35 and the elongated hole 45. Accordingly, the screen 20 can be moved such that the screen 20 follows an appropriate trajectory without increasing a size of the operation lever 24, and hence, increase in size of the operation lever 24 can be avoided whereby the moving device can be simplified.

[0061] The wall thickness reducing hole 50 is formed in the grip 37. Accordingly, a vehicle user can easily grip the grip 37, and hence, the screen 20 can be moved with a small force. A cost can be reduced by reducing an amount of resin for forming the grip 37. A weight of the operation lever 24 can be reduced thus contributing to the reduction of weight of the motorcycle. Further, the swirling of a traveling wind generated around the screen 20 can be suppressed thus contributing to the enhancement of riding comfort of the motorcycle.

[0062] The relative positions of the left rail bracket 23 and the operation lever 24 are set such that the grip 37 at the storage position is arranged behind the left rail bracket 23 and hence, the moving device including the operation lever 24 can be made compact and can be simplified.

[0063] The plurality of engaging recessed portions 52 to 56 which individually correspond to the plurality of vertical positions of the screen 20 are formed on one of the rail brackets 23, and the locking member 57 which is configured to selectively engage with the plurality of engaging portions 52 to 56 corresponding to the folding of the grip 37 into the storage position is housed in the inside of the lever main portion 36. Accordingly, the screen 20 can be held at an arbitrary vertical position with a compact configuration having a small number of parts. Further, such a configuration is not a ratchet mechanism, and hence, it is unnecessary to move the screen 20 to a predetermined position so that the screen 20 can be freely moved. Accordingly, it is possible to provide a user-friendly moving device. In such a moving device, the screen 20 can be moved only when the grip 37 assumes the projecting position and hence, the screen 20 can be

moved with a small force.

[0064] A second embodiment of the invention is explained with reference to Fig. 12 and Fig. 13. Parts corresponding to the parts in the first embodiment are merely shown in the drawings using the same symbols in the first embodiment, and detailed explanation of these parts is omitted.

[0065] An elongated hole 65 which extends in the direction which intersects with a guide hole 35 formed in a rail bracket 23 and having a curved shape is formed in a lever body 38 of a lever main portion 36 of an operation lever 24. A pin-shaped guide projecting portion 66 having a circular transverse cross-section is formed on the support member 22 (see the first embodiment) in a projecting manner, and the guide projecting portion 66 is configured to be slidably fitted in the guide hole 35 and pass through the elongated hole 65.

[0066] Unlike the elongated hole 45 formed in the lever body 38 in the first embodiment which extends linearly, the elongated hole 65 formed in the lever body 38 in the second embodiment is formed of: a lower elongated hole portion 65a which extends in the vertical direction in a state shown in Fig. 12 where the operation lever 24 is rotated downward so as to elevate a screen 20 to an uppermost position (see the first embodiment); and an upper elongated hole portion 65b which is bent from an upper end of the lower elongated hole portion 65a and extends in the direction approximately orthogonal to the guide hole 35.

[0067] When the screen 20 is lowered by rotatably operating the operation lever 24 having such an elongated hole 65 upward, at an initial stage of such an operation, a force acts on the guide projecting portion 66 in the direction along the guide hole 35 from the lever body 38. Accordingly, as indicated by a solid line in Fig. 13, an initial load rises gently so that feeling of operation is improved. On the other hand, in the case of the first embodiment where the elongated hole 45 extends linearly, at an initial stage of such an operation, a force acts on the guide projecting portion 66 in the direction such that the guide projecting portion 66 is pushed to the side surface of the guide hole 35 from the lever body 38. Accordingly, as indicated by a chain line in Fig. 13, an initial load rises sharply thus giving rise to a possibility that feeling of operation is deteriorated.

[0068] Although preferred embodiments of the invention have been explained heretofore, the invention is not limited to the above-mentioned embodiments, and various modifications in design are conceivable without departing from the invention as defined in the claims.

[0069] For example, the operation lever 24 may be arranged on a right side of the vehicle, and the grip 37 may be folded toward the lateral inside of the vehicle.

[0070] The operation lever 24 may be arranged on both left and right sides of the vehicle. In this case, the screen 20 is moved in a state where the screen 20 is supported on both left and right sides and hence, compared to the case where the screen 20 is moved on one side, the screen 20 moves uniformly with respect to the left and right rail brackets 23 whereby it is possible to further suppress rattling of the screen 20 with respect to the rail brackets 23.

[0071] In the above-mentioned embodiments, the operation lever 24 is configured to be rotatable when the grip 37 is at the projecting position, and vertical positions of the operation lever 24 and the screen 20 are held by the selective engagement of the locking member 57 with the plurality of engaging recessed portions 52 to 56 formed on the rail bracket 23 when the grip 37 is folded to the storage position. However, conversely, the operation lever 24 may be configured such that the operation lever 24 is not rotatable when the grip 37 is at the projecting position and the operation lever 24 is rotatable when the grip 37 is folded to the storage position.

[0072] Further, the invention is widely applicable, not only to motorcycles but also to a saddle-ride-type vehicle such as a three-wheeled vehicle.

Claims

1. A screen moving device for a saddle-ride-type vehicle where a wind shield screen (20) is arranged in front of a steering handlebar (12) in a vertically movable manner, the screen moving device comprising: support members (22) disposed on both left and right sides of the screen (20) respectively; a pair of left and right fixed rail brackets (23) provided for guiding the support members (22) in a vertically movable manner; and an operation lever (24) connected to at least one of the pair of support members (22) so as to enable a manual operation which moves the screen (20) vertically, wherein the operation lever (24) includes: a lever main portion (36) which is rotatably supported on at least one of the pair of rail brackets (23) and is connected to at least one of the support members (22); and a grip (37) which is connected to the lever main portion (36) and is capable of being gripped by a vehicle user, and the grip (37) is connected to the lever main portion (36) in a state where the grip (37) is operable between a projecting position where the grip (37) projects from the lever main portion (36) and a storage position where the grip (37) is folded toward a lever main portion (36) side.

2. The screen moving device in a saddle-ride-type vehicle according to claim 1, wherein the operation lever (24) is rotatably supported on the left rail bracket (23) out of the pair of left and right rail brackets (23).

3. The screen moving device in a saddle-ride-type vehicle according to claim 1 or 2, wherein a meter unit (21) which displays vehicle information is arranged between the pair of left and right support members (22), and the grip (37) is connected to the lever main

portion (36) in a state where the grip (37) is folded toward a lateral outside of the vehicle from the lever main portion (36) in the storage position.

4. The screen moving device in a saddle-ride-type vehicle according to any one of claims 1 to 3, wherein both end portions of a connecting member (27) which connects the pair of left and right support members (22) are rotatably connected to the pair of left and right rail brackets (23), a guide hole (35) which guides the support members (22) along a moving trajectory of the screen (20) is formed in the rail bracket (23), and a screen biasing spring (34) which biases the screen (20) upward is disposed between the rail bracket (23) and the connecting member (27).

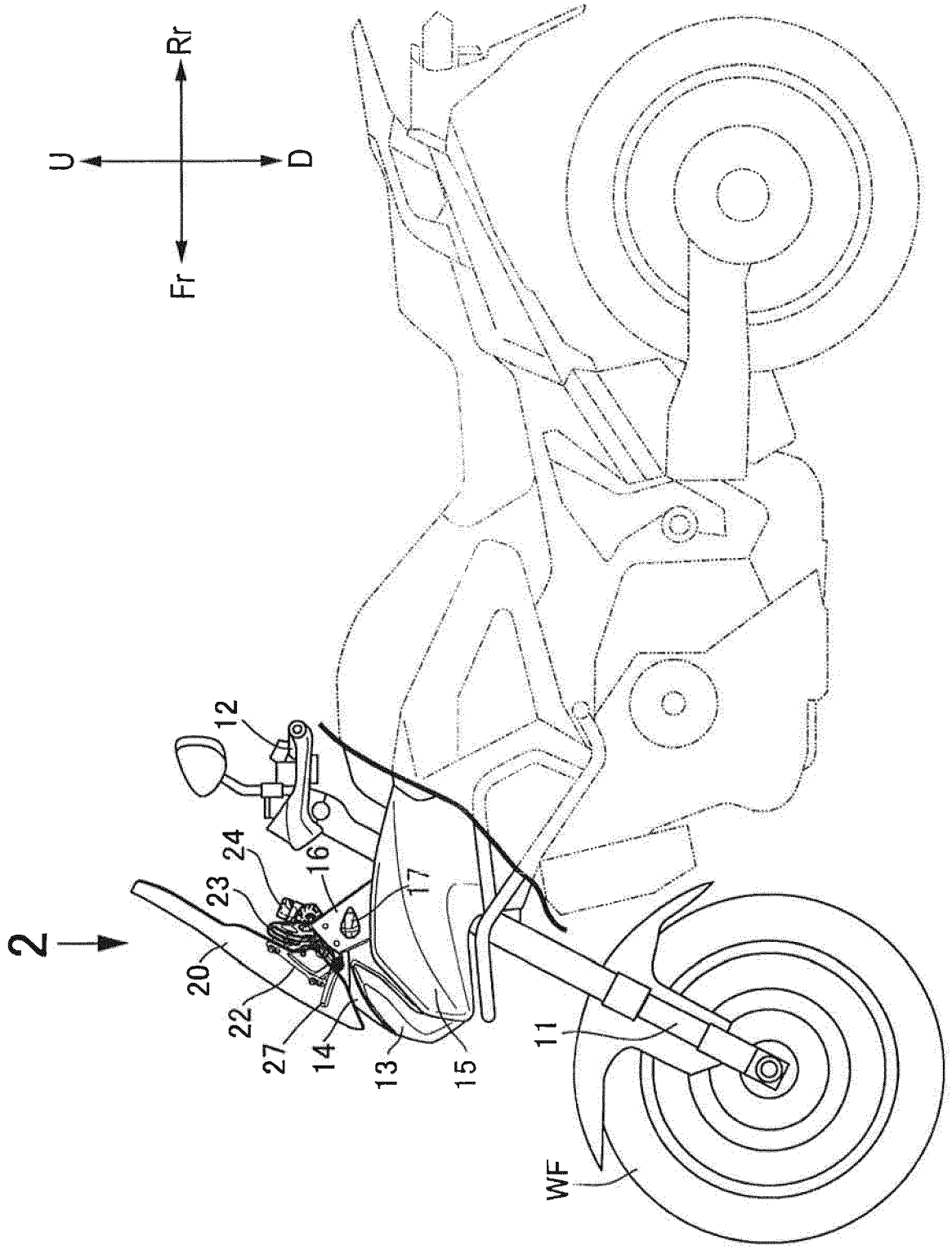
5. The screen moving device in a saddle-ride-type vehicle according to claim 4, wherein the guide hole (35) formed in the rail bracket (23) is formed in an extending manner in a curved shape, an elongated hole (45, 65) extending in a direction which intersects with the guide hole (35) is formed in the lever main portion (36), and a guide projecting portion (46, 66) formed on the support member (22) in a projecting manner is configured to pass through the guide hole (35) and the elongated hole (45, 65).

6. The screen moving device in a saddle-ride-type vehicle according to any one of claims 1 to 5, wherein a wall thickness reducing hole (50) is formed in the grip (37).

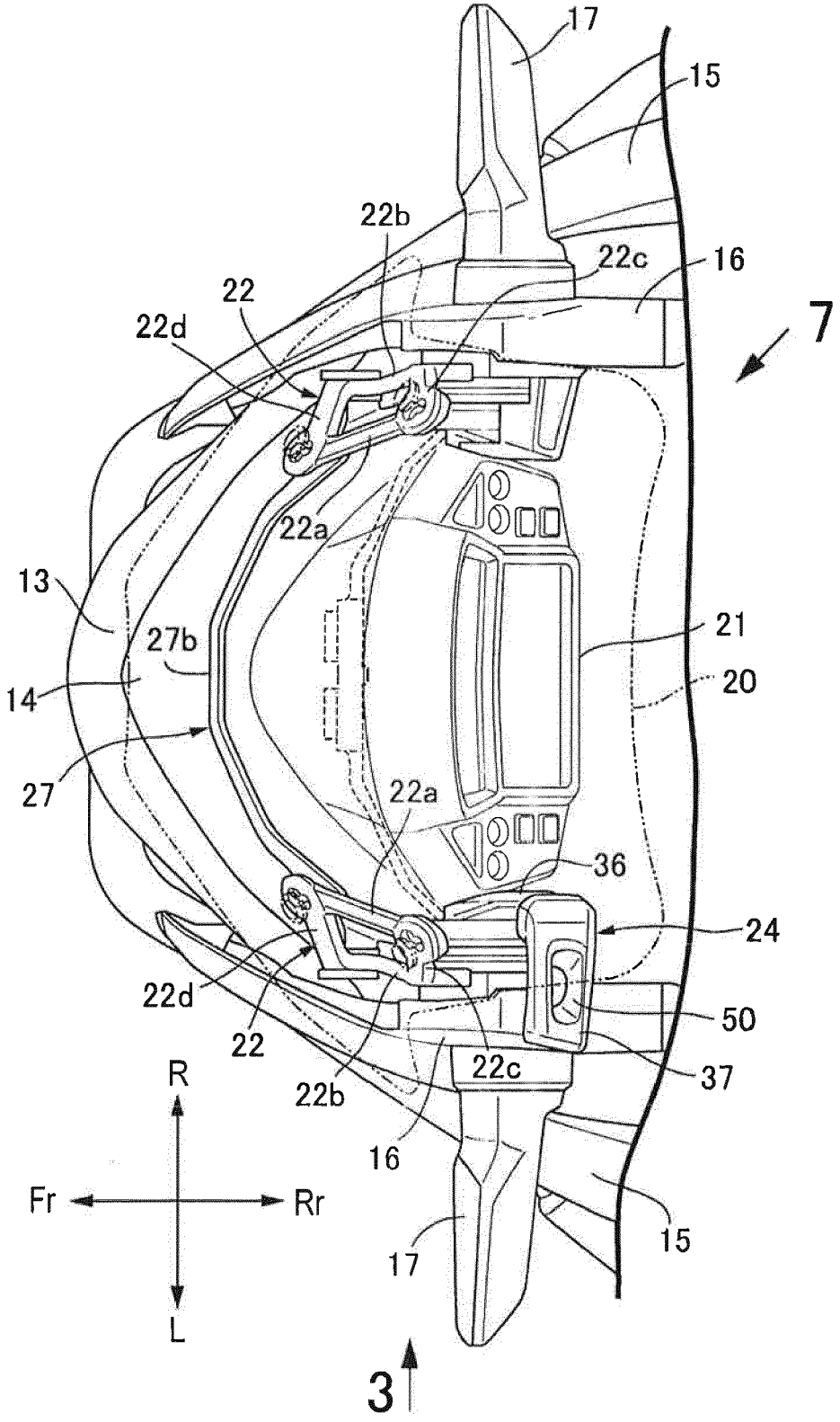
7. The screen moving device in a saddle-ride-type vehicle according to any one of claims 1 to 6, wherein relative positions of the rail bracket (23) and the operation lever (24) are set such that the grip (37) disposed at the storage position is arranged behind at least one of the rail brackets (23).

8. The screen moving device in a saddle-ride-type vehicle according to any one of claims 1 to 7, wherein a plurality of engaging recessed portions (52, 53, 54, 55, 56) individually corresponding to a plurality of vertical positions of the screen (20) are formed on at least one of the rail brackets (23), and a locking member (57) which is configured to selectively engage with the plurality of engaging portions (52 to 56) corresponding to folding of the grip (37) into the storage position is housed in the inside of the lever main portion (36).

[FIG. 1]



[FIG. 2]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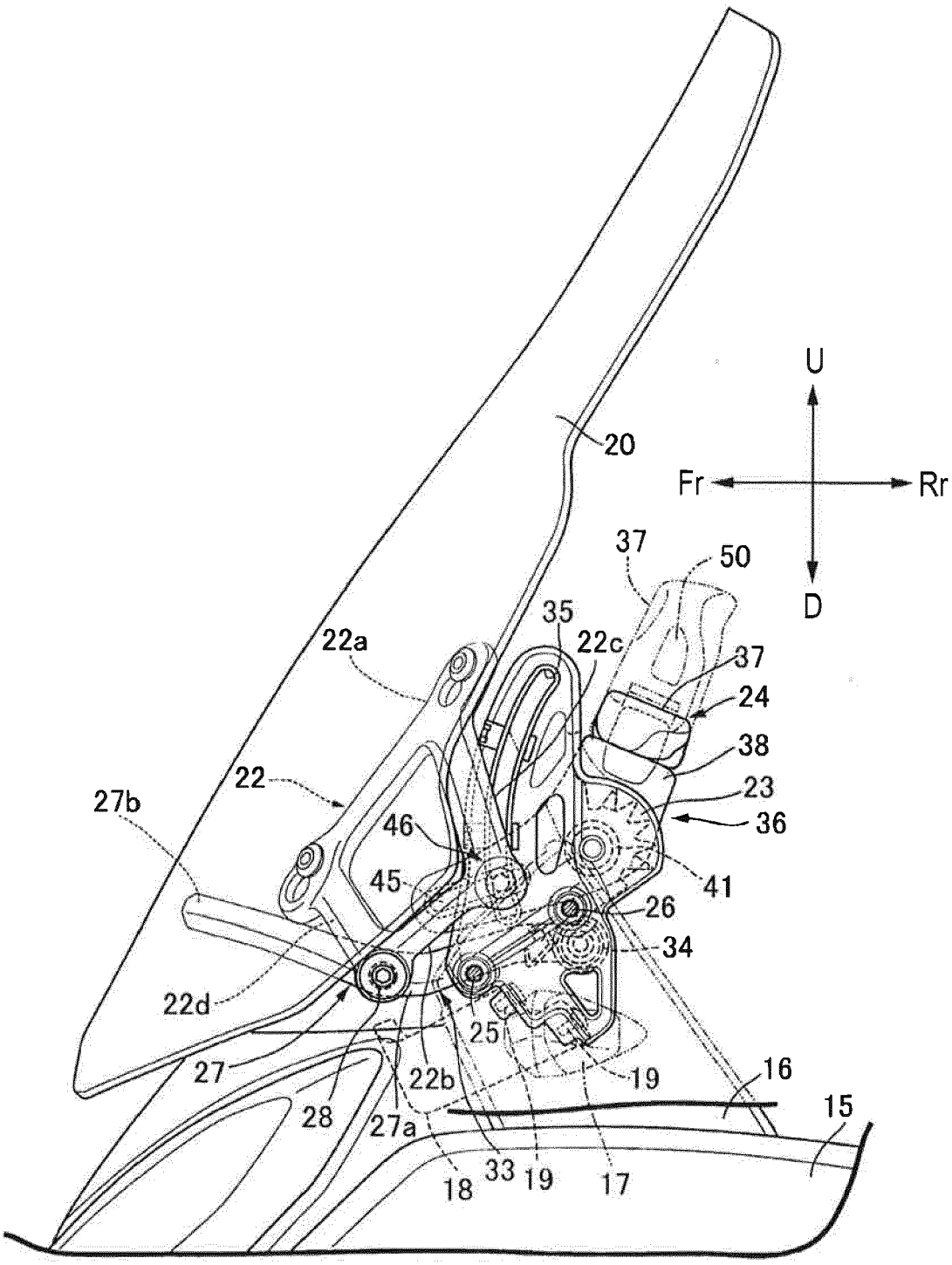
[FIG. 3]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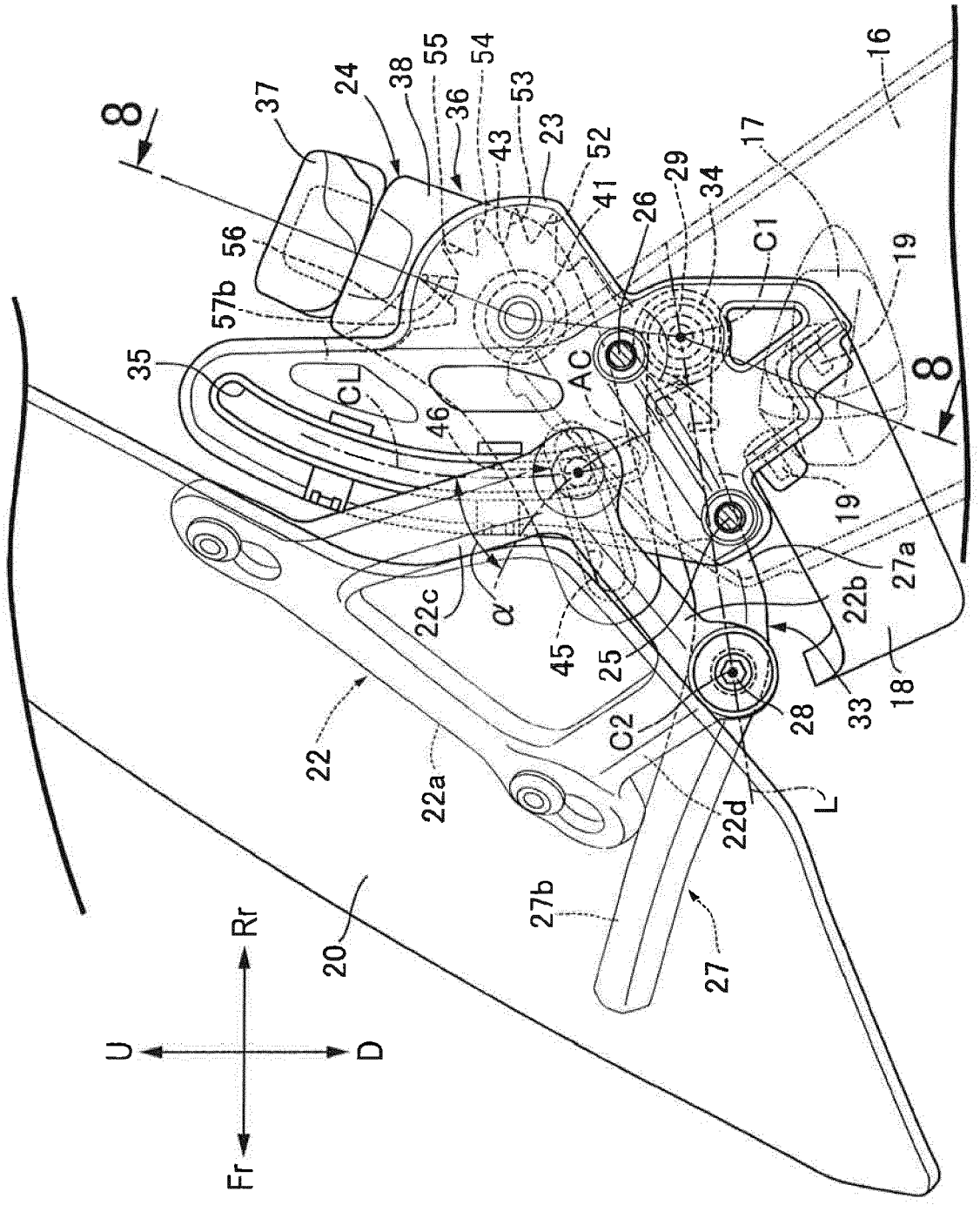
[FIG. 4]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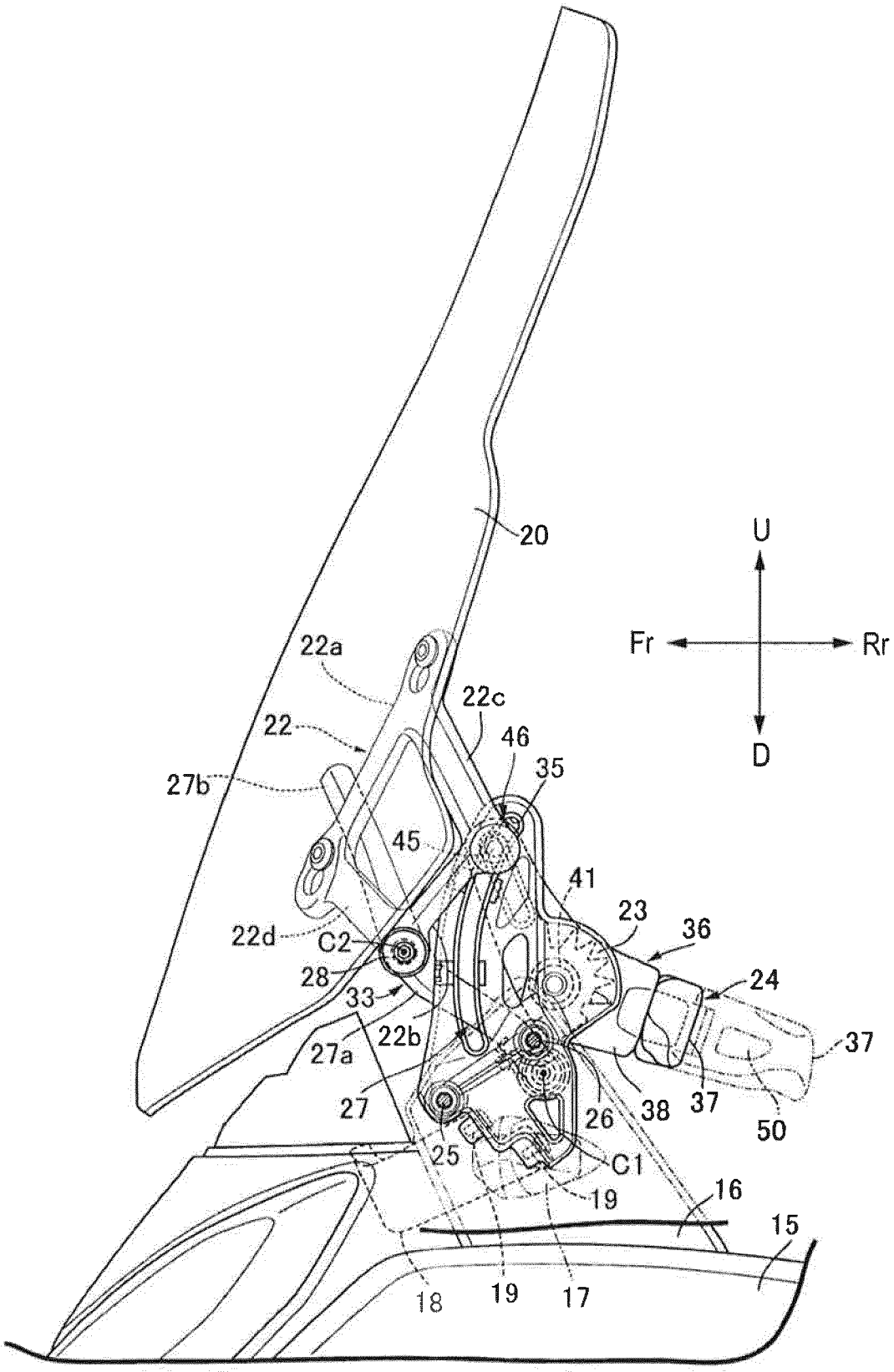
[FIG. 5]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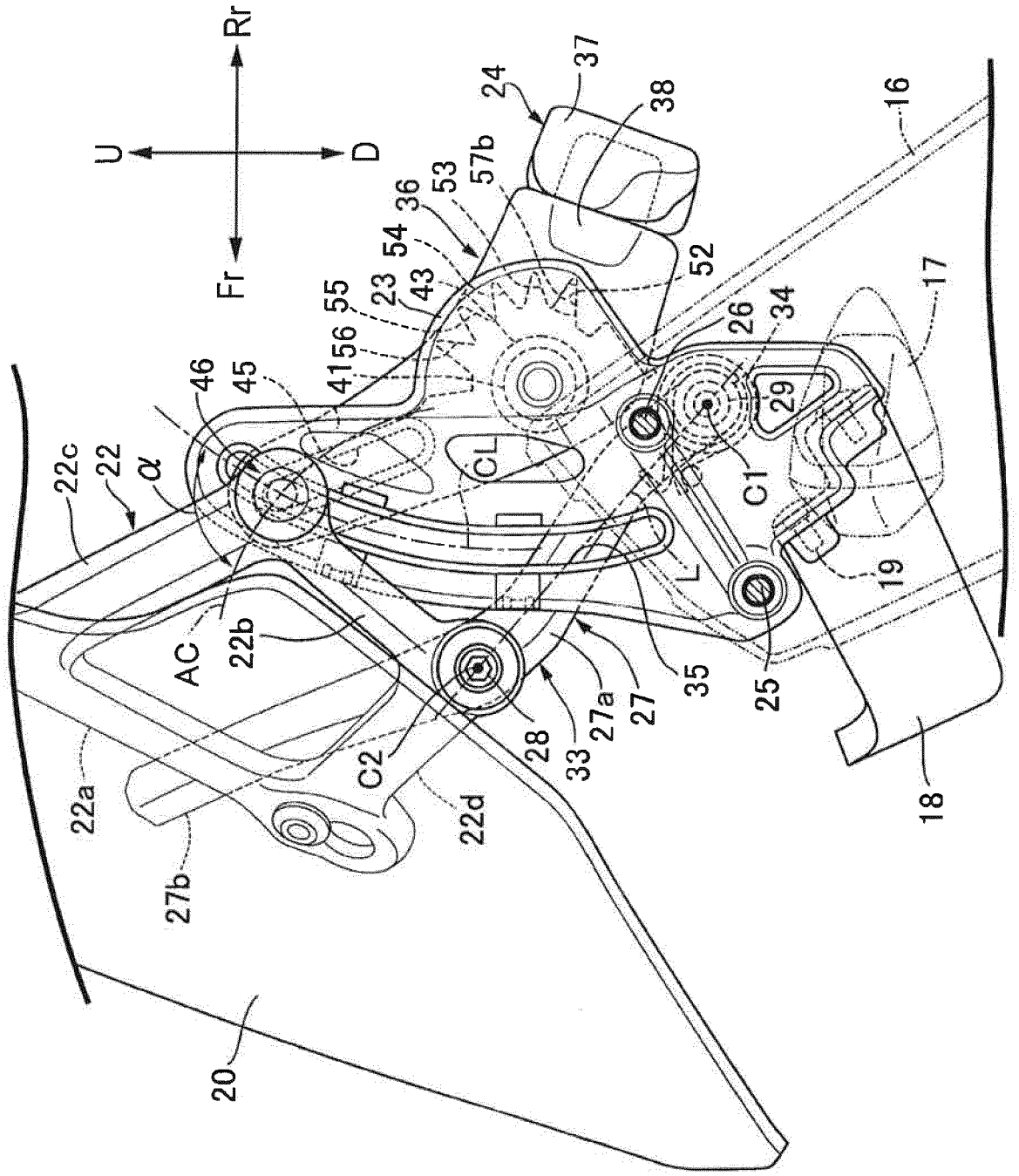
[FIG. 6]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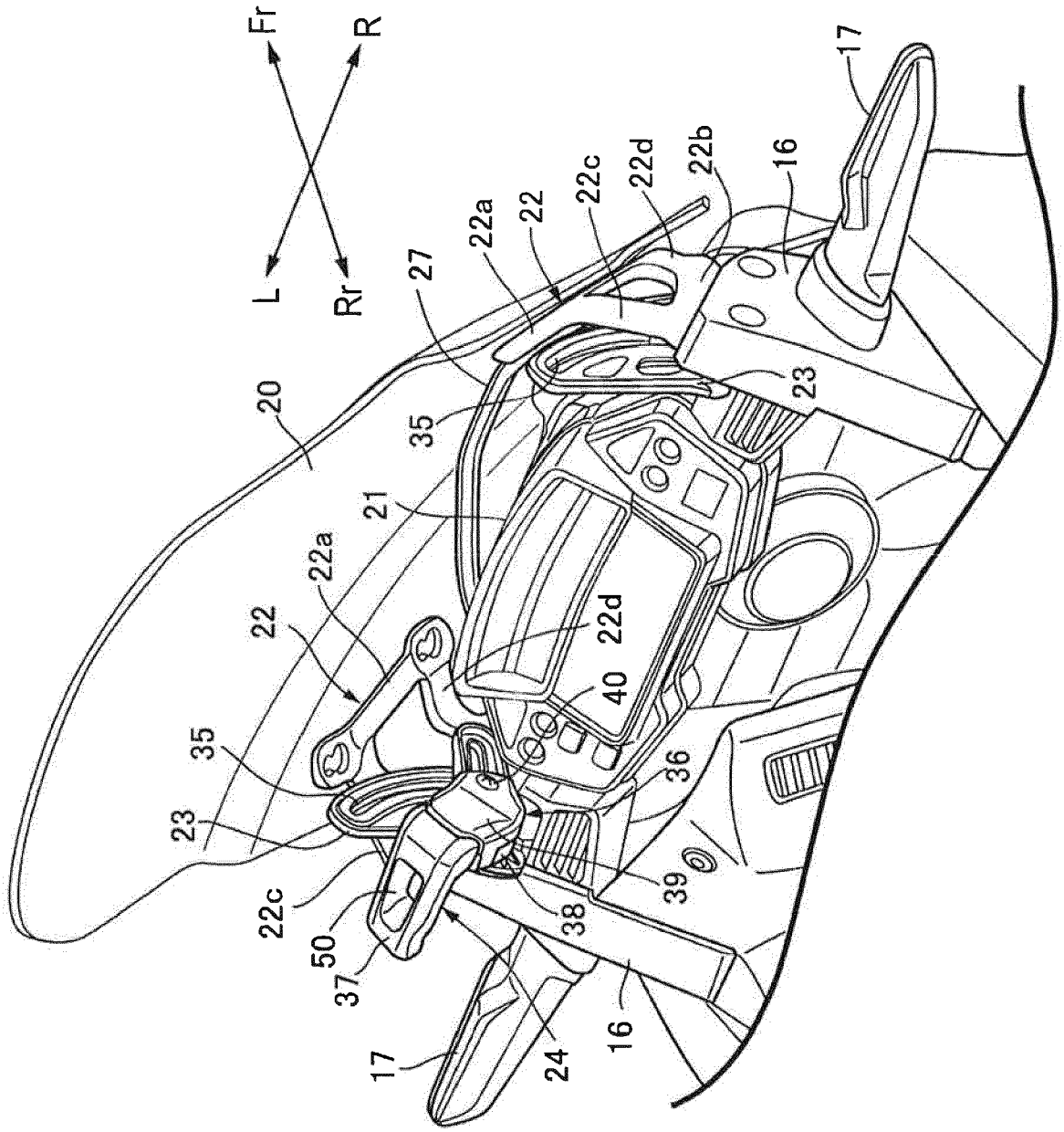
[FIG. 7]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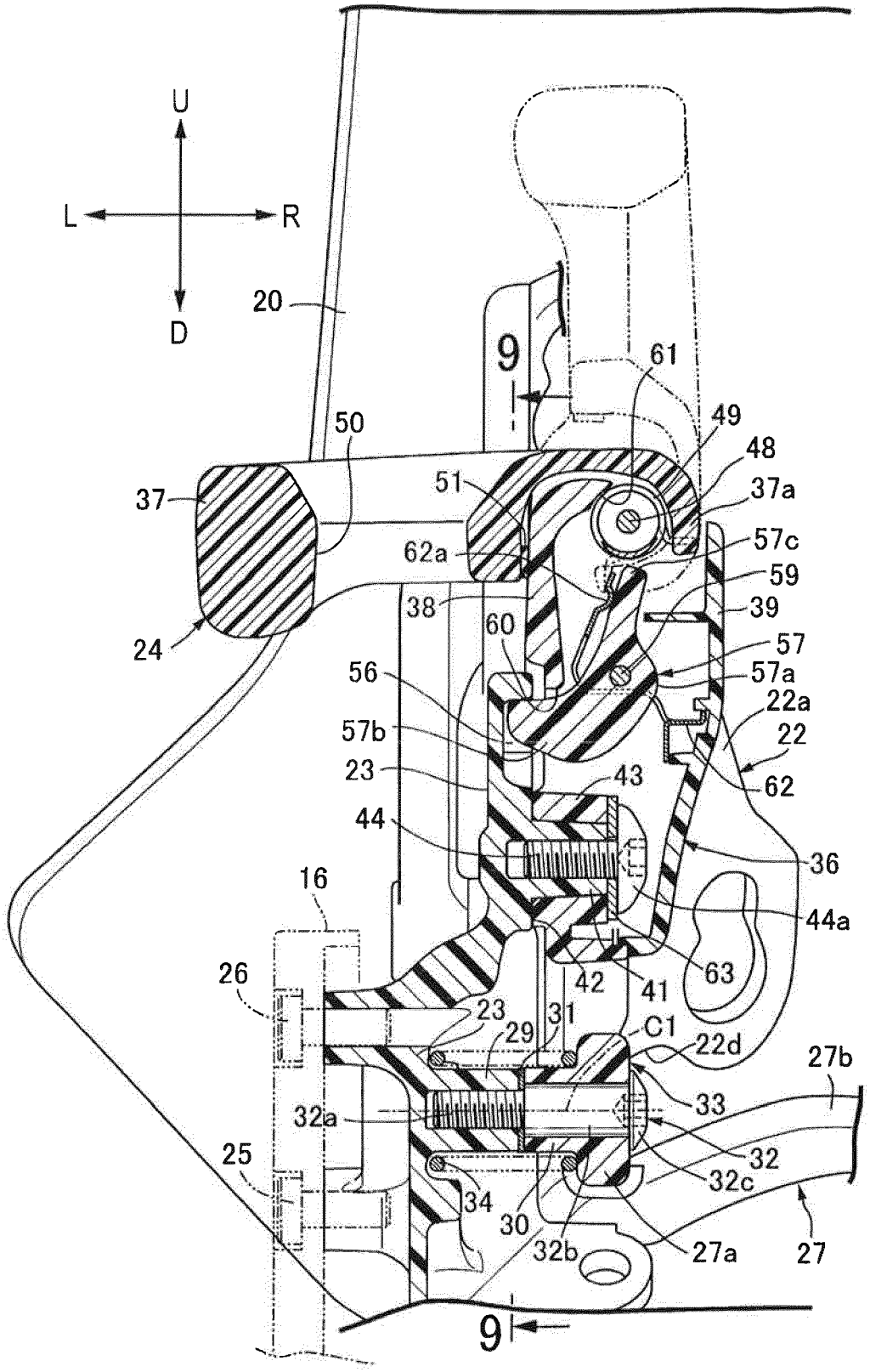
[FIG. 8]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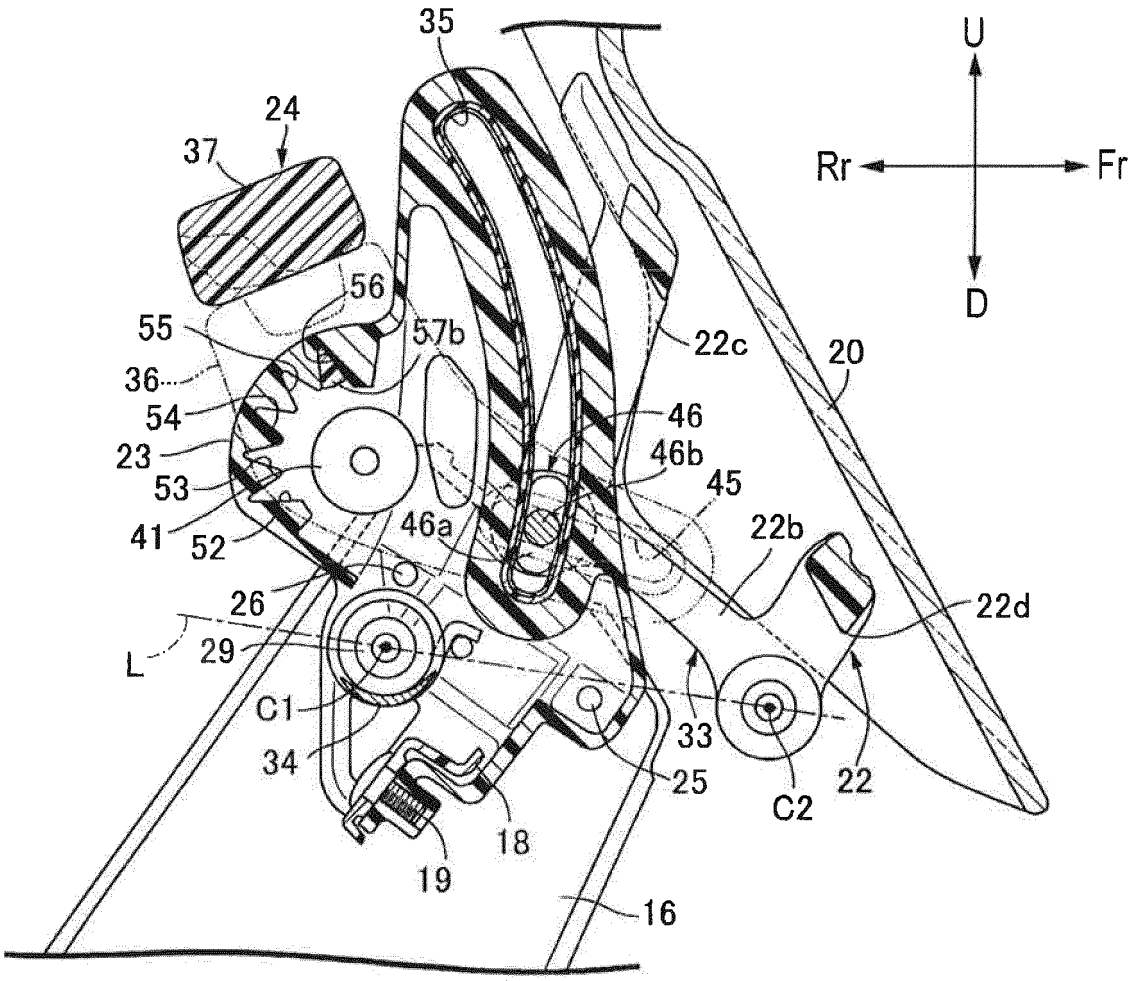
[FIG. 9]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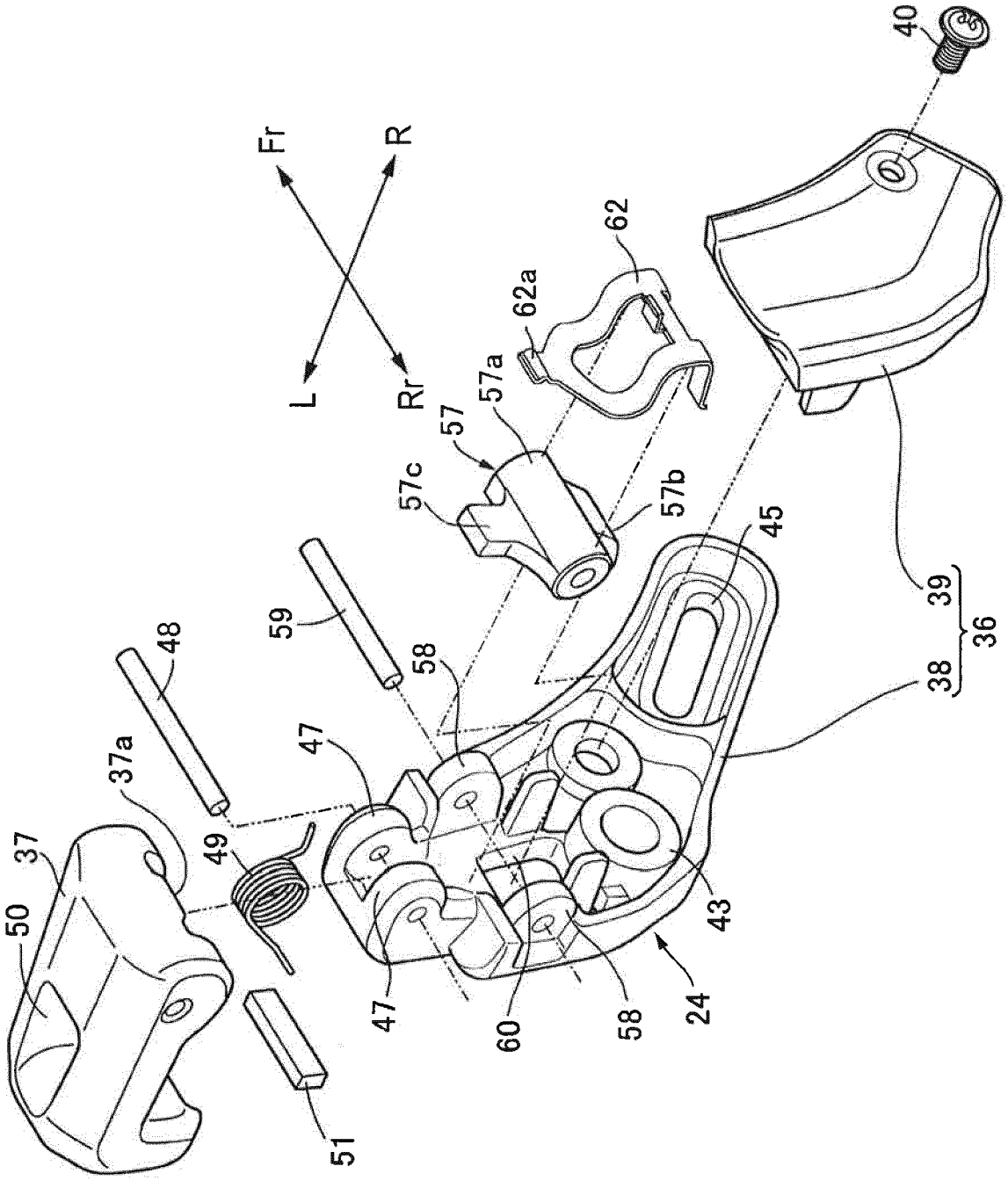
[FIG. 10]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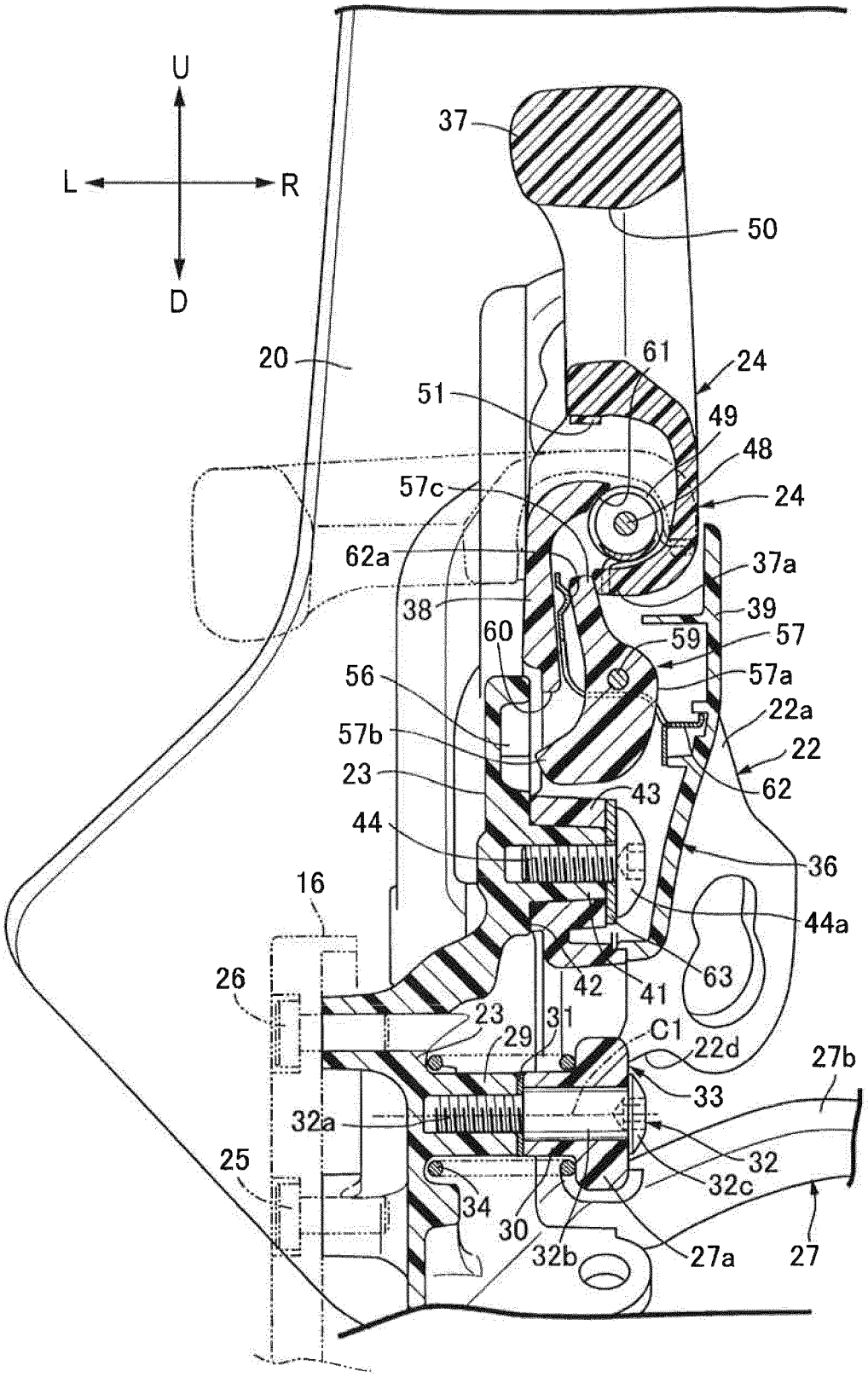
[FIG. 11]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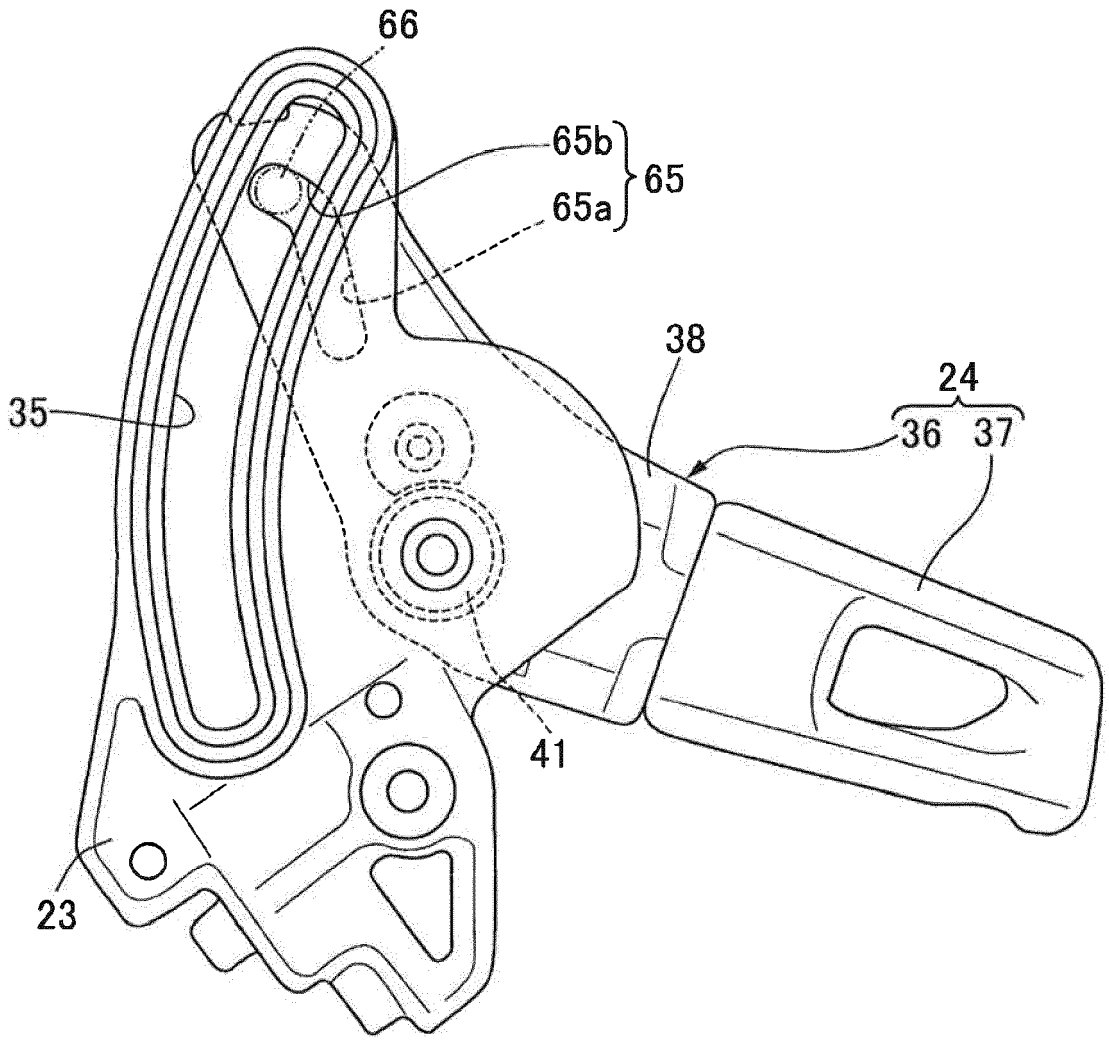
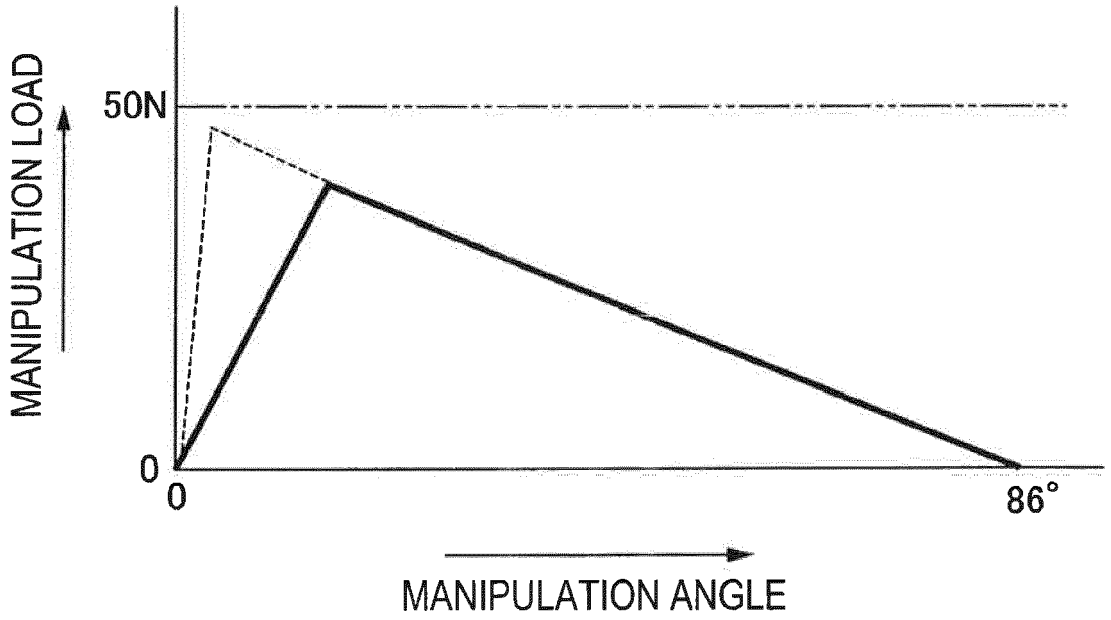
[FIG. 12]



[FIG. 13]



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EUROPEAN SEARCH REPORT

Application Number
EP 16 15 7267

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 6 641 196 B1 (HANAGAN MICHAEL W [US]) 4 November 2003 (2003-11-04) * column 2, line 15 - column 3, line 38; figures 1-6 *	1-8	INV. B62J17/04
A	EP 2 374 700 A1 (KAWASAKI HEAVY IND LTD [JP]) 12 October 2011 (2011-10-12) * paragraphs [0019] - [0100]; figures 1-19 *	1-8	

TECHNICAL FIELDS SEARCHED (IPC)

B62J

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	11 July 2016	Flori, Massimiliano

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11-07-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6641196 B1	04-11-2003	NONE	
EP 2374700 A1	12-10-2011	EP 2374700 A1	12-10-2011
		JP 5495909 B2	21-05-2014
		JP 2011218978 A	04-11-2011

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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Patent documents cited in the description

- JP 2014028591 A **[0002] [0003]**